Distraction osteogenesis for the cranio-maxillofacial region: from basic science to clinical applications

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Distraction osteogenesis is a tissue engineering method of generating new bone by stretching of the divided bone segments with a mechanical device. This technique was originally developed by the orthopaedic surgeons and then implemented in the human cranio-maxillofacial region since 1992. We have a strong belief that advancement in oral and maxillofacial surgery, including distraction, should be based on research in order to be sustainable. Translational basic science research is essential in exploring new methods using animal experiments before trying out in humans. In distraction, our team in Hong Kong has obtained valuable data from basic research on distraction of the temporomandibular joint and maxillary transport distraction. The clinical research can provide evidence based data to confirm whether this method of treatment is better than the traditional technique, which may have a significant impact on the clinical practice. We shall also present findings from two of our clinical trials, on maxillary distraction versus Le Fort I osteotomy in cleft patients and mandibular distraction versus sagittal split osteotomy. On-going distraction in basic science with good potential for clinical applications include continuous distraction, the effect of nicotine on mandibular distraction and the use of distraction as a bone healing model for the study of transgenic stem cell therapy for irradiated mandible.